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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Shinji Shimosaki

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EXAMINER

DINH, BACH T

ART UNIT

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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/509,250	Applicant(s) SHIMOSAKI, SHINJI	
	Examiner BACH T. DINH	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Summary

1. This is the response to the Amendment filed on 04/29/2008.
2. Claims 1-16 remain pending in the application.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 7, 9-10, 13 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Fray et al. (WO 99/64638).

Regarding claims 1-2, Fray et al describes a method for purification wherein molten calcium chloride at 950 degrees C (melted alkali metal salt) was placed in a titanium crucible (claimed titanium)/vessel and brought in contact with titanium oxide to adsorb impurities of the metal salt. See page 9, lines 6-10. The prior art would inherently produce the purifying step because it performs the same method steps as recited in the claimed invention; specifically, the melted calcium chloride metal salt is brought into contact with titanium material of the titanium crucible.

Regarding claim 3 and 10, Fray et describes titanium foil. See page 9, line 12.

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Regarding claim 7, Fray et al describes a potential of 3V applied between the anode and the titanium crucible, thus, exhibiting electrolysis. See page 9, lines 6-10.

Regarding claim 9, Fray et al describes the same vessel is used for purification as for production of titanium material. See page 9, lines 6-10.

Regarding claim 13, Fray et al describes all of the claimed limitations of claim 2 above, further describing the production of titanium. See page 9, lines 12-15.

Regarding claim 15, Fray et al describes titanium (TiO₂) added to the bath for the purification step. See page 9, lines 6-10.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
7. Claims 4-6, 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fray et al (WO 99/64638) in view of Fray et al (WO 2003/048399 - US 2006/0086621 will be used as the English equivalent).

Regarding claim 4-5, Fray et al ('638) describes an electrolysis method of a fused salt (See abstract) wherein CaCl_2 is the molten salt (See page 9, lines 6-10), but does not expressly describe the addition of calcium to the purified molten product.

Fray et al ('621) describes an electrochemical method of a fused salt (See abstract) wherein calcium, 8, is added to the bath of CaCl_2 melt in order to improve the amount of oxygen that can be removed from titanium (See figure 2; See also figure 5, para 0064-0069).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the calcium of Fray et al ('621) in the method of Fray et al ('638) in order to improve the amount of oxygen that can be removed from titanium.

Regarding claim 6, Fray et al ('638) describes the same vessel is used for purification as for production of titanium material. See page 9, lines 6-10.

Regarding claim 12, modified Fray et al ('638) describes all of the claimed limitations as discussed with respect to claim 5 above, wherein Fray et al ('638) describes the same vessel is used for purification as for production of titanium material. See page 9, lines 6-

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10.

Regarding claim 16, Fray et al ('638) describes titanium (TiO₂) added to the bath for the purification step. See page 9, lines 6-10.

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fray et al (WO 99164638) as applied to claim 2 and further in view of Fray et al (WO 20031048399 - US 200610086621 will be used as the English equivalent).

Regarding claim 11, Fray et al ('638) describes an electrolysis method of a fused salt (See abstract) wherein CaCl₂ is the molten salt (See page 9, lines 6-10), but does not expressly describe the addition of calcium to the purified molten product.

Fray et al ('221) describes an electrochemical method of a fused salt (See abstract) wherein calcium, 8, is added to the bath of CaCl₂ melt in order to improve the amount of oxygen that could be removed from the titanium (See figure 2; See also figure 5, para 0064-0069).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the calcium of Fray et al ('221) in the method of Fray et al ('638) in order to improve the amount of oxygen that could be removed from the titanium.

9. Claims 8 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fray et al (WO 99/64638) as applied to claim 1 and further in view of Shindo et al (Japanese Patent # 03291391).

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Regarding claim 8, Fray et al ('638) describes all of the claimed limitations of claim 1 above, further disclosing the production of pure titanium (See page 9, lines 12- 15), but does not describe LiCl-KCl system mixed salt used for electrolysis of the molten salt. Shindo et al discloses a method for producing high purity titanium wherein foil like titanium is immerse into an electrolyte bath of LiCl-KCl used as molten salt for electrolysis in order to produce extremely high purity titanium in superior yield. See abstract.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the LiCl-KCl mixed salt in Shindo et al in the method of Fray et al ('638) in order to produce extremely high purity titanium in superior yield.

Regarding claim 14, Fray et al ('638) describes the same vessel used for purification as for production of titanium material and bringing into contact (all are brought into contact within the crucible containing electrolyte). See page 9, lines 6-10.

Response to Arguments

10. Applicant's arguments filed 04/29/2008 have been fully considered but they are not persuasive.

Regarding Applicant's argument that the disclosure of Fray (WO 99/64638) fails to anticipate the subject matter of claim 1; however, according to the claim language, purification of the metal salt is the result of bringing melted alkaline earth metal salt into contact with titanium. Fray discloses (page 9, lines 6-10) that melted metal salt (molten

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calcium chloride, which is an alkaline earth metal salt) is brought into contact with titanium (titanium material of the titanium crucible), thereby the impurities of the melted metal salt would have been absorbed by the titanium material of the crucible. Therefore, Fray discloses all the required steps for purifying a metal salt as required by current claim. Furthermore, claim 1 recites "a method of purifying a metal salt..." which is not the same as "...purify the molten bath" as asserted by Applicant (see page 3 lines 8-9 of Request for Reconsideration).

Regarding Applicant's argument that the combination of Fray ('621) and Fray ('638) is not the same as the combined processing of claim 4, Examiner traverses that Fray ('638) discloses the method of purifying metal salt as required by claim 1 as discussed above and Fray ('621) discloses the addition of metallic calcium to improve deoxidizing a titanium material (TiO_2 , paragraphs 65-69). Therefore, the combination of Fray ('638) and Fray ('621) is proper. Furthermore, Applicant argues that the combined processing of claim 4 is "...the purification of the metal bath (claim 1)" (see page 4 of Request for Reconsideration); however, claim 1 recites a method of purifying a metal salt, not a method of purifying a metal bath. Therefore, the argument directs to subject matters that are not part of the claim language.

Regarding Applicant's argument that the disclosure of Fray ('638) fails to anticipate the subject matter of claim 7; once again, Applicant asserts that the method of claim 1 is directed towards purification of a bath "... claim 7 defines a two step process of

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electrolysis using a bath purified by the method of claim 1", however, claim 1 directs to a method of purifying a metal salt. Furthermore, Applicant asserts that "the Examiner's reasoning means that purification must occur at the same time as the electrolysis"; however, this is not the reasoning behind the Examiner's rejection. In fact, Fray ('638) discloses (page 9 lines 6-10) "A white TiO_2 pellet ... was placed in a titanium crucible filled with molten calcium chloride ...", therefore, it is clear that molten calcium chloride is already present in the titanium crucible prior to the addition of TiO_2 pellet and the molten calcium chloride would have been purified by coming into contact with the titanium material of the titanium crucible. In addition, the molten calcium chloride can still be purified by the titanium material of the titanium crucible even in the presence of TiO_2 pellet. Therefore, in accordance with the language of claim 1 as stated above, Fray discloses the method of purifying a metal salt by bringing molten metal salt (molten calcium chloride) into contact with the titanium material of the titanium crucible.

Furthermore, Fray also discloses a method of producing a titanium material (producing the pellet of 99.8% titanium from TiO_2 pellet) which comprises conducting molten metal salt electrolysis by using a molten product of a metal salt purified by the purification method according to claim 1 for electrolytic path (applying a potential of 3V to the molten calcium chloride in the titanium crucible, page 9 lines 6-10). Therefore, the disclosure of Fray ('638) anticipates the subject matters of claim 7.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACH T. DINH whose telephone number is (571)270-5118. The examiner can normally be reached on Monday-Friday EST 7:00 A.M-3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit
1753

BD
08/04/2008